

Canada

May 2, 2006

File # (DFO) 5300-10-083

**COURSE OF ACTION DECISION**

**RED CHRIS COPPER-GOLD MINE PROJECT**

As Responsible Authorities (RAs) under the *Canadian Environmental Assessment Act* (2003) (CEAA), Natural Resources Canada (NRCan) and Fisheries and Oceans Canada (DFO) have completed an environmental assessment and have produced a Screening Report regarding the proposed Red Chris Copper-Gold Mine Project.

To the extent that section 20 of the CEAA applies to this project as scoped by NRCan and DFO, and after taking into consideration the Screening Report and the implementation of proposed mitigation measures that the RAs consider appropriate, NRCan and DFO have determined that the Project is not likely to cause significant adverse environmental effects.

The proponent, Red Chris Development Company Ltd., and related contractors may now proceed with the process of applying for a license as issued by NRCan pursuant to paragraph 7(1)(a) of the *Explosives Act*. DFO may also proceed as appropriate with a subsection 35(2) *Fisheries Act* authorization for the harmful alteration, disruption or destruction (HADD) of fish habitat.

To the extent that subsection 5(2) of the CEAA applies to this project as scoped by NRCan and DFO, DFO shall consider the Screening Report in relation to determining whether to recommend to the Governor in Council the designation of the headwaters of Trail Creek as a Tailings Impoundment Area (TIA) on Schedule 2 of the *Metal Mining Effluent Regulations* (MMER) pursuant to paragraphs 36(5) (a) to (e) of the *Fisheries Act*.

CEAR reference number 04-01-3181



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# **RED CHRIS COPPER-GOLD MINE PROJECT**

## **SCREENING REPORT**

With Respect to:

The Requirements of a Screening Pursuant to the  
*Canadian Environmental Assessment Act*, SC 2003, c.9  
CEA Registry Reference Number: 04-01-3181

Prepared by

**Department of Fisheries and Oceans**  
**Department of Natural Resources**

**April 19, 2006**

**Canada**

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## **SCREENING REPORT for the RED CHRIS MINE PROJECT**

### **1.0 Introduction**

Red Chris Development Company Ltd. (the Proponent) is proposing to develop a 30,000 tonne/day open-pit mining and milling operation for the production of copper and gold in the form of copper concentrate from mineral deposits located on the Todagin Plateau in north-western British Columbia (Figure 1). The Proponent estimates a mine lifespan of 25 years.

An environmental assessment (EA) under the *Canadian Environmental Assessment Act* (CEAA) is required for the proposed development because Natural Resources Canada (NRCan) contemplates the issuance of a licence pursuant to paragraph 7(1)(a) of the *Explosives Act* and Fisheries and Oceans Canada (DFO) contemplates the issuance of authorizations under s.35(2) of the *Fisheries Act* for the harmful alteration, disruption or destruction (HADD) of fish habitat and contemplates the recommendation to the Governor in Council for the making of regulations to list the headwaters of Trail Creek as a Tailings Impoundment Area (TIA) on Schedule 2 of the *Metal Mining Effluent Regulations* (MMER) pursuant to paragraphs 36(5) (a) to (e) of the *Fisheries Act*.

### **2.0 Information on Proposed Development**

#### **2.1 Proponent**

Red Chris Development Company Ltd., a wholly owned subsidiary of bcMetals Corporation, is the 100% owner and operator of the Red Chris property. Red Chris Development Company Ltd. and bcMetals Corporation are primarily in the business of mineral exploration and mine development.

The contact information for the Proponent is as follows:

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<b>Title:</b>	Vice President, Environmental, Government and First Nations Affairs bcMetals Corporation Red Chris Development Company Limited
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<b>Telephone :</b>	604-683-0140
<b>Fax :</b>	604-683-0126
<b>Email :</b>	<a href="mailto:info@bcmetalscorp.com">info@bcmetalscorp.com</a>
<b>Web:</b>	<a href="http://www.bcmetalscorp.com">www.bcmetalscorp.com</a>

# SCREENING REPORT for the RED CHRIS MINE PROJECT

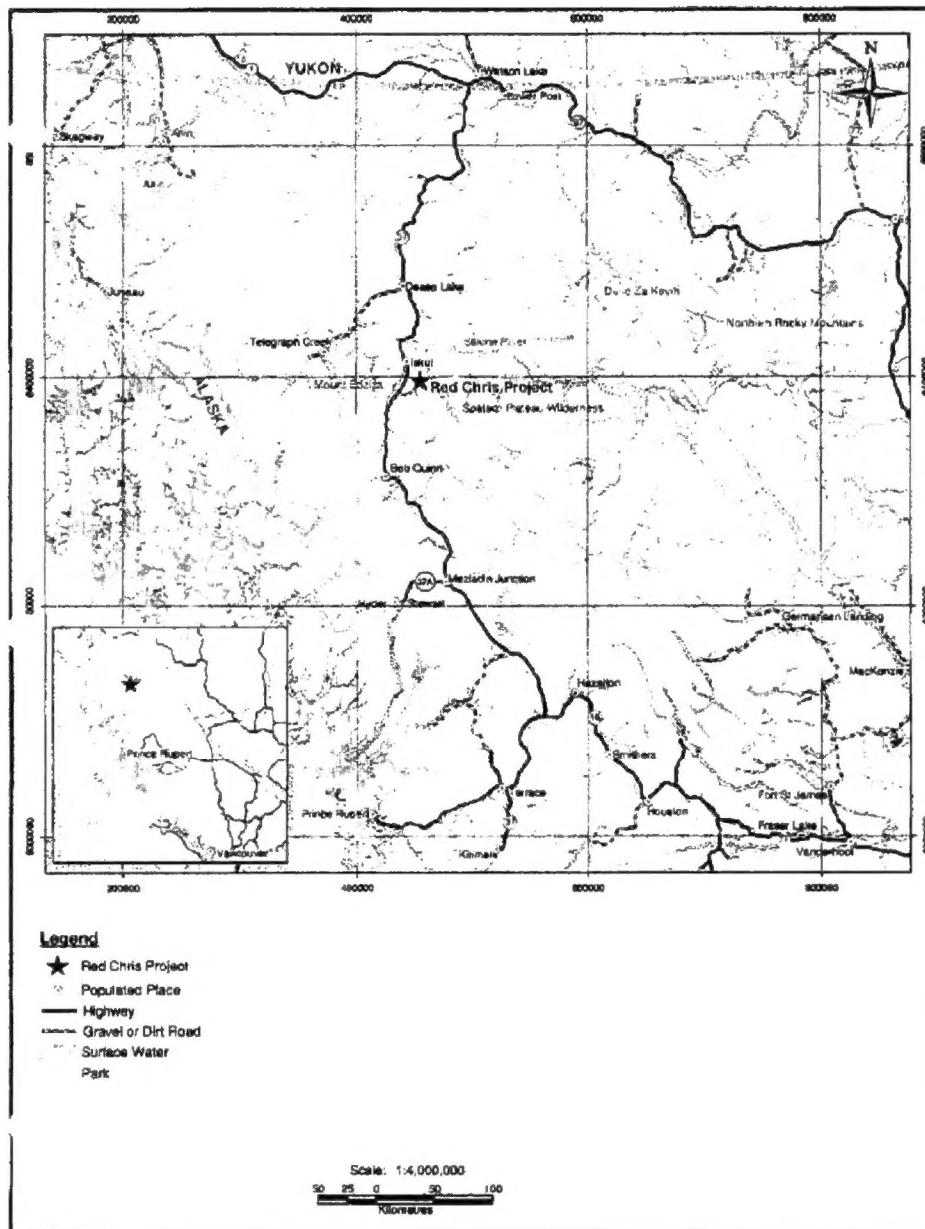


Figure 1: Red Chris Project - Location Map

## **SCREENING REPORT for the RED CHRIS MINE PROJECT**

### ***2.2 Location of Proposed Development***

The Red Chris property is located about 18 km southeast of the village of Iskut and 80 km south of Dease Lake on the north-facing Todagin Plateau between Ealue and Kluea Lakes in north-western British Columbia, Canada. The deep-sea port of Stewart is situated about 200 km to the south. The property is centred on latitude 57° 42' North, longitude 129° 47' West within NTS map sheet 104H/12W, Liard Mining Division. The property straddles the boundaries of the Iskut and Stikine watersheds (Figure 1).

The Red Chris property is situated on the eastern portion of the Todagin upland plateau, which forms a subdivision of the Klastine Plateau along the northern margin of the northern boreal Skeena Mountains. The Red Chris property consists of 120 two-post, 8 fractional and 28 modified grid contiguous mineral claims for a total of 452 units. The total claim block covers approximately 110 square km. The majority of the claim block has been held continuously for upwards of 40 years and all claims remain in good standing.

The development area falls within the Todagin Resource Management Zone of the Cassiar Iskut-Stikine Land and Resource Management Plan (CIS-LRMP), which recognizes mineral exploration, mine development and mine access as appropriate activities.

### ***2.3 Description of Proposed Development***

The open-pit mining and milling operation for the production of copper and gold proposed by the Proponent comprises:

- two open pits (Main and East Zone) that would eventually merge into one;
- mine camp, maintenance shop and associated works;
- a processing plant for the production of copper concentrate;
- a TIA and associated water diversion system;
- waste rock dump, low grade ore stockpiles;
- explosives factory and/or magazine;
- water supply and associated works;
- any on-site or off-site compensation or mitigation projects as may be required;
- run-off collection system and possible mine effluent treatment plant;
- a new 23 km access and haul road and related infrastructure to Highway 37;
- a new power line (adjacent to the access road) from Highway 37 to the minesite;
- the use of the existing concentrate storage facility and ship-loading facilities at the Port of Stewart; and
- activities included in constructing, operating, maintaining and decommissioning the above facilities.

## **SCREENING REPORT for the RED CHRIS MINE PROJECT**

The proposed mine development is based on a mill production rate of 30,000 tonnes per day of ore for sale to the export market, over a projected mine life of 25 years. The 550 tonnes of concentrate produced per day would be transported by truck to the Stewart Bulk Terminals via a new access road and Highway 37.

The minesite would be accessed by a new 23 km long access road which would intersect Highway 37 on the south side of Coyote Creek. A staging area and access control point with a fenced compound would be located adjacent to Highway 37.

The Proponent proposes the construction of a new powerline that would parallel the proposed mine access road and link with a northward extension of an existing powerline from Meziadin Junction to Iskut that is currently being considered by the Province to service communities and industry in this area of British Columbia. At this time, the RAs understand that there is no formal decision by the Government of BC on whether to build the powerline.

The Proponent has made a commitment, reflected as a condition of the Provincial EA Certificate for the mine development, to wait until there is positive indication on the hydroelectric power supply from the Government of BC before beginning full-scale construction. The Proponent also stated that they may wish to begin access road construction if an alternative viable power source becomes available to meet the needs of the proposed development.

### **3.0 Description of the Local Environment**

The Red Chris property is located in the northern boreal Skeena Mountains of north-western British Columbia, with characteristic sub-alpine to alpine environmental conditions. Hydrology of the region is both rain and snowmelt-driven. Elevations on the property are typically 1,500 +/- 30m with relatively flat topography broken by several deep creek gullies. Bedrock exposure is confined to the higher relief drainages and along mountainous ridges. A thin layer of glacial till covers the majority of the property.

Vegetation on the Togadin plateau consists of scrub birch and willow, grasses and mosses. Within the creek valleys are several varieties of conifer and deciduous trees including balsam, fir, cedar, spruce and aspen. A variety of terrestrial wildlife species, fish and amphibians also use and/or inhabit the general project area which lies in the Spruce-Willow-Birch biogeoclimatic zone.

### **4.0 Regulatory Context**

#### **4.1 Responsible Authorities (RAs)**

On May 31, 2004, DFO concluded that an authorization under the *Fisheries Act* will likely be required for components of the Red Chris Mine proposal, thereby triggering a

## SCREENING REPORT for the RED CHRIS MINE PROJECT

federal EA under the CEAA. In addition to DFO, Natural Resources Canada (NRCan) subsequently identified itself as a Responsible Authority (RA) for the possible issuance of a licence pursuant to the *Explosives Act*. Initially Transport Canada (TC) was also identified as an RA. Upon further examination of project information for the access road, TC determined that it would not require an approval under the *Navigable Waters Protection Act* and thus were no longer an RA.

Under paragraph 5(1)(d) of the *Canadian Environmental Assessment Act* (CEAA), the following powers, duties or functions are envisioned in relation to the proposed Red Chris Mine development:

1. NRCan contemplates the issuance of a licence pursuant to paragraph 7(1)(a) of the *Explosives Act* for construction of the explosives factory and/or magazine on the mine property.
2. DFO contemplates the issuance of authorizations under s. 35(2) of the *Fisheries Act* for the harmful alteration, disruption or destruction (HADD) of fish habitat:
  - i) in Trail Creek resulting from construction, operation and post-closure of a water diversion system;
  - ii) in Quarry Creek and Northeast (NE) Arm Creek in the Klappan River system resulting from the construction, operation and post-closure of a water diversion system;
  - iii) in Trail Creek, Quarry Creek and NE Arm Creek associated with the construction, operation and post-closure of dams required as a part of the TIA; and
  - iv) adjacent to the Klappan River as a result of the installation of an intake pipe.
3. Regulations to be made by the Governor in Council are contemplated to list the headwaters of Trail Creek as a TIA on Schedule 2 of the *Metal Mining Effluent Regulations* (MMER) pursuant to paragraphs 36(5) (a) to (e) of the *Fisheries Act*.

Under the MMER, a "TIA" means:

- (a) a water or place set out in Schedule 2; or
- (b) a disposal area that is confined by anthropogenic or natural structures or by both, but does not include a disposal area that is, or is part of, a natural water body that is frequented by fish.

The section of Trail Creek where the TIA is proposed will encompass waters frequented by fish. As this TIA is not set out in Schedule 2, an amendment to the regulations to list the headwaters of Trail Creek as a TIA on Schedule 2 of the MMER would be required for the project to proceed and would be made by the Governor in Council. Following the completion of the CEAA screening, DFO would notify Environment Canada, who would prepare the required documents to propose the amendment of Schedule 2 of the MMER to the Governor in Council.

## **SCREENING REPORT for the RED CHRIS MINE PROJECT**

Before the RAs can make a decision to allow the proposed development to proceed in whole or in part, they must ensure that an EA is carried out in accordance with the CEAA and that a screening report is prepared, pursuant to section 14 of the CEAA.

Pursuant to the CEAA, section 55, the Canadian Environmental Assessment Registry (CEAR) has been established to provide notice of this environmental assessment, and facilitate public access to records related to this environmental assessment, CEAR Reference Number 04-01-3181. The CEAR consists of a project file and an internet site. The internet component of the CEAR can be accessed at the following address: <http://www.ceaa-acee.gc.ca>. Anyone wishing to obtain copies, or view records, on the CEAR project file should contact: Carolyn Deering, email: [deeringc@pac.dfo-mpo.gc.ca](mailto:deeringc@pac.dfo-mpo.gc.ca).

Contact information for the two Responsible Authorities for this proposed development are:

<b>Department:</b>	Natural Resources Canada
<b>Contact Name:</b>	Mr. Denis Lagacé
<b>Title:</b>	Director General
<b>Sector:</b>	Minerals and Metals Sector
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## **SCREENING REPORT for the RED CHRIS MINE PROJECT**

### **4.2 Federal Environmental Assessment Coordinator**

The Federal Environmental Assessment Coordinator (FEAC) for this Project is the Canadian Environmental Assessment (CEA) Agency. The Agency contact person is:

Mr. Dave Carter  
Senior Program Officer  
Canadian Environmental Assessment Agency  
320-757 West Hastings Street  
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Email: [Dave.Carter@ceaa-acee.gc.ca](mailto:Dave.Carter@ceaa-acee.gc.ca)

### **4.3 Other Federal Department(s) Involved**

Environment Canada and Health Canada (as expert federal authorities or FAs) provided expert advice in relation to the EA of the Red Chris development proposal. Advice was received from Environment Canada on water quality, hydrology, wildlife, climate, air quality and potential malfunctions and accidents. From Health Canada, expert advice was received on health matters.

### **4.4 Cooperative Federal / Provincial EA Process**

The proposed Red Chris Mine development was also subject to the requirements of an EA by the Government of British Columbia under the BC *Environmental Assessment Act*. The provincial EA included all components of the proposed Red Chris development proposal. In support of the "Canada-British Columbia Agreement for Environmental Assessment Cooperation (2004)", the provincial and federal EAs were coordinated through a single cooperative EA process led by the BC Environmental Assessment Office (BCEAO). This process meets the legal requirements of both governments while maintaining the existing roles and responsibilities of each level of government.

A project workplan was developed to identify the process for the cooperative EA. Federal agencies commented on key documents prepared by the Proponent, including the Terms of Reference and the Proponent Application for an EA Certificate - Red Chris Project, BC Canada., October 2004 (the Application), and also were active on the Interagency Committee Working Group and the Fisheries Compensation Plan Technical Working Group to ensure that issues of federal concern were identified in the EA process. In this capacity, RAs and federal expert authorities (FAs) provided advice on elements of the Red Chris development proposal relevant to their expertise.

## **SCREENING REPORT for the RED CHRIS MINE PROJECT**

At the conclusion of the cooperative EA review, the respective governments have produced separate reports with respect to its project as scoped. Each government will make its respective decision based on the shared information gathered and analyzed through the cooperative EA process.

The provincial EA was concluded on August 24, 2005 and the Government of British Columbia issued their Environmental Assessment Certificate, M05-02 pursuant to the BC *Environmental Assessment Act*.

Questions concerning the provincial EA can be directed to:

<b>Contact Name:</b>	Mr. Garry Alexander
<b>Department:</b>	BC Environmental Assessment Office
<b>Title:</b>	Director, Strategic Policy and Planning
<b>Address:</b>	2nd Floor – 836 Yates Street, Victoria BC, V8W 9V1
<b>Telephone:</b>	250 387-9675
<b>Fax:</b>	250 356-6448
<b>E-mail address:</b>	<a href="mailto:garry.alexander@gems3.gov.bc.ca">garry.alexander@gems3.gov.bc.ca</a>

### **5.0 Consultations**

The BCEAO led consultations with the Proponent, local governments, First Nations, federal and provincial agencies, and other communities of interest (with emphasis in Stewart, Iskut, Dease Lake, and Telegraph Creek) to provide opportunities to review the proposed development and to ensure their input into the EA process. The RAs have used the information collected from these consultations to inform their screening decision. A summary of consultation efforts with First Nations can be found in Sections 3 and 5.4, and Appendices E and F of the BCEAO report. A summary of community consultation efforts undertaken by the Proponent and BCEAO are presented in Section 3.2 of the BCEAO report.

The RAs are satisfied that this effort towards public consultation provided sufficient and satisfactory opportunities for public input into the Red Chris EA process. Based on the extent of consultation that has been conducted by the Government of BC and the Proponent, and the information that the RAs received from this consultation, the RAs are of the opinion that public participation in the screening of the Project under CEAA 18(3) is not appropriate under these circumstances.

#### **5.1 Federal Government's Involvement**

A project workplan was developed with the RAs input to identify the process for the cooperative EA. The federal CEA agency, FAs and RAs were fully engaged in the

## **SCREENING REPORT for the RED CHRIS MINE PROJECT**

process and commented on key documents prepared by the Proponent, including the Provincial Terms of Reference and the Provincial Application. Throughout the cooperative EA, the federal government was an active participant, ensuring that issues of federal concern were identified in the review of the Project. The CEA Agency, RAs and FAs participated in the Interagency Committee Working Group, the Fisheries Compensation Plan Technical Working Group and First Nation meetings.

### **5.2 *First Nations' Involvement***

The Proponent initiated contact with the Tahltan Band Council and Iskut First Nation prior to the Company becoming publicly traded and prior to the onset of site exploration activity in September 2003. Contact with these First Nations groups has continued on a regular basis since that time with the focus of discussions being the mitigation of potential environmental effects associated with development activities.

Discussions with Tahltan and Iskut leaders and the Proponent resulted in the signing of an MOU on January 19, 2004. The MOU outlines a set of principles under which the Proponent and the First Nations will work together in the development of the Red Chris Mine. The MOU foresees the parties working towards a more comprehensive Participation Agreement and discussions between the parties are continuing towards this end. It is the intent of both the Proponent and the First Nations that consultation and input from the First Nations will be ongoing throughout the life of the Project. The Proponent also completed a Traditional Use Study involving the Tahltan and Iskut First Nations. This traditional use study was drawn on to identify baseline environmental conditions.

The BCEAO communicated on a regular basis with the Tahltan and Iskut First Nations and provided them with written updates on progress of the review process. The BCEAO ensured that all Project documentation was sent to First Nation representatives, and that they were kept fully informed at all stages of the cooperative EA review. Representatives from the Tahltan Band, Tahltan Central Council (TCC) and the Iskut First Nation were invited to sit on the interagency committee Working Group.

The BCEAO provided funding to the Tahltan Central Council to hire an independent technical consultant and establish review teams within the community to facilitate the review of the Application and Application Supplement.

Through the cooperative EA process, the BCEAO kept RAs apprised of ongoing consultation efforts, and RAs participated in meetings with representatives of the Tahltan and Iskut First Nations. The RAs also participated alongside FN representatives in the EA Working Group meetings and during site visits.

## SCREENING REPORT for the RED CHRIS MINE PROJECT

### 6.0 Scope of Project and Factors Considered

#### 6.1 Scope of Project

Based upon the CEAA paragraph 5(1)(d); powers, duties, or functions, identified in section 4.1 of this report, and in accordance with subsection 15(1) of the CEAA, the RAs have determined the scope of the project for the purposes of the EA under the CEAA is:

- the construction, operation, modification and decommissioning of the Tailings Impoundment Area (TIA) including barriers and seepage dams in the headwaters of Trail, Quarry and NE Arm creeks;
- the construction, operation, modification and decommissioning of the potential water diversion system in the headwaters of Trail, Quarry, and NE Arm creeks;
- the construction, operation, modification and decommissioning of the Ancillary facilities supporting the process water supply pipeline intake adjacent to the Klappan River;
- the construction, operation, modification and decommissioning of a proposed explosives factory and/or magazine on the mine property;
- the deposit of a deleterious substance (tailings) into a TIA;
- any works or undertakings required as mitigation and compensation for the HADD of fish habitat associated with construction of the TIA that may require an authorization under the *Fisheries Act*; and
- any works or undertakings required as compensation for the deposit of tailings into the TIA that may require an authorization under the *Fisheries Act*.

As none of the above elements are on the *Comprehensive Study List Regulations*, the RAs were required to conduct a screening EA and prepare a screening report.

Throughout the remainder of the screening report, the term "Project" in respect of the proposed Red Chris Copper Gold Mine refers to the project as scoped by the RAs as described in this section.

#### 6.2 Factors Considered

The RAs considered the following factors in the EA in accordance with section 16 of the CEAA:

1. The environmental effects (and their significance) of the Project, including the environmental effects (and their significance) of malfunctions or accidents that may occur in connection with the Project;
2. Cumulative environmental effects (and their significance) that are likely to result from the Project in combination with other projects or activities that have been or will be carried out;

## SCREENING REPORT for the RED CHRIS MINE PROJECT

3. Comments from the public that are received in accordance with CEAA and the regulations;
4. Measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the Project; and
5. The alternative means of carrying out the Project, specifically the potential relocation of the proposed TIA and the potential relocation of the explosives factory and/or magazine.

In addition, the RAs considered community knowledge and aboriginal traditional knowledge.

As defined under CEAA, “environmental effect” means, in respect of a project:

- (a) any change that the project may cause in the environment, including any change it may cause to a listed wildlife species, its critical habitat or the residences of individuals of that species, as those terms are defined in subsection 2(1) of the Species at Risk Act,*
- (b) any effect of any change referred to in paragraph (a) on*
  - (i) health and socio-economic conditions*
  - (ii) physical and cultural heritage*
  - (iii) the current use of lands and resources for traditional purposes by aboriginal persons, or*
  - (iv) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, or*
- (c) any change to the project that may be caused by the environment.*

Within the context of the factors to be considered as outlined above, the RAs considered the following potential Project-related effects and measures that were technically and economically feasible to mitigate those effects:

- i. Effects of the Project on surface hydrology of Trail Creek, Quarry Creek, Northeast Arm Creek, and Klappan River;
- ii. Effects of the Project on water quality in Trail Creek, Quarry Creek, Northeast Arm Creek, Kluca Lake;
- iii. Effects of the Project on fisheries and aquatic resources in Trail Creek, Quarry Creek, Northeast Arm Creek, Kluca Lake, and Klappan River and related compensation measures in Coyote Creek;
- iv. Effects of the Project on terrestrial wildlife and vegetation (moose, grizzly bear, beaver, martin, migratory birds, and species listed under the *Species at Risk Act* such as the western toad);
- v. Effects of the Project on climate;
- vi. Effects of the Project on air quality;
- vii. Effects of accidents or malfunctions associated with the Project on fisheries resources or terrestrial wildlife and vegetation;

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- viii. Effects of changes in fisheries and terrestrial wildlife/vegetation caused by the Project on health and socio-economic conditions;
- ix. Effects of changes in fisheries and terrestrial wildlife/vegetation caused by the Project on physical and cultural heritage;
- x. Effects of changes in fisheries and terrestrial wildlife/vegetation caused by the Project on the current use of lands and resources for traditional purposes by aboriginal persons (trail network, hunting, fishing, trapping);
- xi. Effects of changes in fisheries and terrestrial wildlife/vegetation caused by the Project on archaeological sites;
- xii. Effects of the environment on the Project; and
- xiii. Potential cumulative environmental effects of residual effects listed above in combination with effects of other projects or activities that have been or will be carried out.

As well, the RAs considered alternative locations for the TIA as well as fisheries compensation measures associated with any s. 35(2) *Fisheries Act* authorizations and the TIA. The Proponent has agreed to provide NRCan with alternative explosives factory/magazine sites as part of the formal application for an Explosives Licence.

### **Spatial and Temporal Boundaries:**

The EA of the factors to be considered encompassed varying spatial boundaries specific to each factor in order to effectively assess the potential environmental effects of the Project. Effects on fish and fish habitat through Trail Creek, Quarry Creek, NorthEast Arm Creek, Kluea Lake and its outlet stream, and proposed compensation measures in Coyote Creek and Ealue Lake were considered in this screening report. Effects on terrestrial resources were considered in Trail Creek watershed. Effects considered from the proposed explosives factory and/or magazine were confined to the minesite.

The temporal boundaries encompass the entire lifespan of the Project (expected to be approximately 25 years) plus the additional period after decommissioning to monitor and address final flow regime out of the TIA. The EA discussed the effects of the Project on each factor, beginning with the construction phases for the various components, throughout the operations phase (including any maintenance and/or modifications) to the completion of the decommissioning phase.

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### **7.0 Environmental Effects Assessment**

The preparation of this screening report has been based on information collected through the cooperative federal/provincial EA process described in section 4.4. To develop this report, the RAs have utilized the Proponent's application, consultant studies and multi-stakeholder information collected as part of the cooperative federal/provincial EA process and summarized by the BCEAO in their July 22, 2005 report, "Environmental Assessment Office – Red Chris Porphyry Copper-Gold Project Assessment Report.", hereafter referred to as the "BCEAO report".

The effects of the Project, measures to mitigate those effects and the significance of the effects of the Project are considered in the following sections 7.1 to 7.11 of this report.

#### **7.1 Surface Hydrology**

##### **7.1.1 Background on Effects to Surface Hydrology**

Surface hydrology is discussed in section 4.1.9 of the Application, while groundwater is discussed in section 4.1.10 of the Application, including the impact from the proposed TIA. Potential effects to surface hydrology include changes to existing drainage patterns, as described below.

1. Quarry Creek watershed: A small increase in drainage area of Quarry Creek is expected due to the construction of diversion ditches and the North Dam and associated seepage dam construction. At closure, the Quarry Creek drainage area will be reduced by approximately 6%. Overall effects are expected to be small on both the local and regional level;
2. Kluea – Todagin watershed: Construction of the South Dam and associated seepage dam will result in a 14-16 % reduction in mean annual discharge. Overall, minimal effects on the flow are expected in Kluea-Todagin Creek in the context of the hydrology of the local study area (see anticipated effects of this reduction on fish in Section 7.3.2 of this report);
3. Trail Creek watershed: Construction and operation of the TIA and the seepage pond will result in a reduction in the Trail Creek catchment area and reduction in Trail Creek flow (approximately 62% at its outlet into Kluea Lake);
4. Northeast Arm (NE) Creek: During the decommissioning of the mine, a spillway will be constructed adjacent to the NE dam which will increase the catchment area for NE Arm Creek by approximately 145%. The resulting doubling of flows in NE Arm Creek from the Trail Creek (Iskut) drainage, while substantial within its 12 sq km watershed, is anticipated to pose minimal effects once it converges with the Klappan River, having a watershed area of 3550 sq km; and
5. Klappan River: Withdrawal of water which will only occur if the well option for fresh water is deficient; will have a minimal impact on the Klappan River (based

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on a withdrawal rate of ~ 0.03 cms in relation to a calculated seven-day low flow that has a 1:10 year return period of 6.68 cms for Klappan River) .

### **7.1.2 Mitigation of Effects to Surface Hydrology**

The RAs have reviewed the proposed mitigation measures listed in the Proponent's Commitment Table and as described in section 5.1.5 and 5.1.6 of the BCEAO report. Hydrologic monitoring will be undertaken during mine construction and operations, including measurement of:

1. Water levels and discharges at the existing monitoring stations on Trail Creek, and Kluea-Todagin Creek;
2. Water levels and discharges in NE Arm Creek;
3. Releases from the tailings facility to Quarry and NE Arm Creeks; and
4. Water levels in Kluea Lake.

Environment Canada (EC) noted that the predicted runoff volume from the site is thought to be higher than other mines in the Province. The Proponent's response was that the conservative approach taken in estimating the total annual precipitation has resulted in an over-estimate of water to be managed that could be 30-35 % higher than the actual amount. This approach effectively led to over-design of project components.

### **7.1.3 Significance of Effects to Surface Hydrology**

The RAs are satisfied with the information provided in section 5.1.4, 5.1.5, and 5.1.6 of the BCEAO report regarding the summary of effects of the Project on surface hydrology and monitoring. With expert federal advice obtained from EC and DFO, the RAs have determined that the Project, with implementation of proposed mitigation measures, is not likely to cause significant adverse effects to surface hydrology.

## **7.2 Water Quality**

### **7.2.1 Background on Effects to Water Quality**

The RAs reviewed section 5.1.5 of the BCEAO report, which describes the effects to water quality from the Red Chris development proposal. Water quality may be affected by acid rock drainage and metal leaching (ARD/ML), a natural geologic event caused by the oxidation of acid rocks. Subsequent metal leaching and acidic runoff may reduce local water quality in the receiving environment if management of materials and treatment of runoff is not undertaken. The management and effects of acid-generating waste rock and tailings through their deposition in the TIA are considered in this federal screening review.

Information on geochemical characterization and the potential for ARD/ML is presented in section 4.1.11 of the Application and updated results for 2004 are presented in section

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6 of the Application Supplement. A prevention/management plan for ARD/ML is summarized in sections 6.4, 6.5, 6.6 and 6.7 of the Application and a Reclamation/Closure Plan is presented in section 6.8, some of which pertains to the proposed TIA.

Section 6 of the Application anticipates that excess water from the proposed TIA would need to be discharged to the environment both during mining operations and post-closure.

### **7.2.2 Mitigation of the Effects to Water Quality**

The RAs have reviewed the commitments made by the Proponent (Ref. E1 to E19 inclusive and F1 to F16 incl. in the draft Commitments Table of App. C in the BCEAO report) to mitigate effects to water quality on the Red Chris development proposal.

In the context of this Project, the TIA will contain potential deleterious ARD/ML contaminants. Through prevention measures, including segregation, placement of acid-generating tailings within the proposed TIA, and seepage control measures, ARD/ML is expected to be mitigated to applicable standards under the BC *Environmental Management Act*. The effluent to be discharged into the receiving environment will be monitored and required to meet the federal MMER.

The Proponent has also agreed that there will be multiple response plans and monitoring programs in place to address water quality issues, such as:

1. Acid Rock Drainage and Metal Leaching Prediction and Prevention Plan;
2. Sediment Control Plan;
3. Pollution Prevention Plan;
4. Spill Contingency and Emergency Response Plan;
5. Environmental Effects Monitoring Plan; and
6. Reclamation / Closure Plan

### **7.2.3 Significance of the Effects to Water Quality**

Effects to water quality from the Project will be localized and restricted to within the local watercourses draining the TIA and Kluca Lake contained within the mine operation area. Taking into account the proposed mitigation measures, no residual environmental effects to water quality in the receiving environment are expected. In the event of accidents, the Spill Contingency and Emergency Response Plan (SCERP) will be designed to address and manage any potential effects. The federal Environmental Effects Monitoring (EEM) program of the MMER will assess potential residual effects of accidents.

The RAs considered the information provided in section 5.1.5 of the BCEAO report regarding environmental effects of the Project to water quality and proposed mitigation measures described in the Proponent's Commitments Table. With expert federal advice obtained from Environment Canada, the RAs have determined that the Project, with

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implementation of proposed mitigation measures, is not likely to cause significant adverse effects to water quality.

### **7.3 Fisheries and Aquatic Resources**

Section 4.1.15 of the Application describes fisheries and aquatic resources in the Project area. The information presented is based on studies conducted in 1995 and 1996 and data compiled by the Proponent in 2003, summarized in Section 7.3.1 below. An update is also provided in section 10.1 of the Application Supplement which consists of a report on data collection in the summer of 2004 on fish and aquatic resources for locations in the Trail Creek watershed upstream of Kluea Lake and Quarry Creek. The purpose of the fish community surveys was to determine the distribution of rainbow trout in the watercourses draining the Project site and to determine the importance of the streams used for spawning and rearing.

Other aquatic resources, such as aquatic invertebrates and periphyton, were also surveyed and reported in section 4.1.16 of the Application. Stream sampling of primary and secondary producers occurred in most streams targeted for fish surveys. In addition to directly affecting food availability for fish, changes in abundance and composition of aquatic resources can indicate changes in environmental quality, and serve as early warning indicators of change before fish communities are affected. Any such changes will be identified through an EEM program required under a BC *Environmental Management Act* permit and MMER.

#### **7.3.1 Background to Fisheries and Aquatic Resources**

The fisheries and aquatic resources in the Trail Creek watershed upstream of Kluea Lake, including a shallow 7.7 hectare lake known as Black Lake in the upper reaches of Trail Creek would be flooded and buried within a proposed TIA. The Trail Creek system provides an important spawning and rearing system for the only inlet-spawning rainbow trout stock of Kluea Lake. While recent surveys did not find evidence of fish presence in Black Lake, a series of beaver dams would have impeded upstream migration into the lake. Traditional use studies reported in the Application also confirmed trout fishing occurred in Black Lake at one time. Rainbow trout spawning also occurs in the outlet of Kluea Lake.

Rainbow trout and bull trout also spawn and/or rear in reaches of Quarry Creek and NE Arm Creek downstream of the extent of the proposed TIA. These drain into Klappan River, which supports populations of mountain whitefish, arctic grayling, Dolly Varden, bull trout, cutthroat trout, rainbow trout, longnose sucker, and burbot.

Baseline studies showed that there are rainbow trout present within the lower reaches of Trail Creek, up to and including the proposed location of the South Dam of the TIA and in Kluea Lake downstream of Trail Creek. The upper reaches of Trail Creek, including

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the small pond known as "Black Lake" have had no fish captured in recent surveys, though reports of historic trout presence are indicated through a traditional use survey. No fish species other than rainbow trout have been identified within Trail Creek or any of the other streams immediately downstream of the TIA site.

### 7.3.2 Effects on Fisheries and Aquatic Resources

The proposed TIA will adversely affect some fish habitat, watercourses and aquatic resources by flooding and infilling the upper reaches of Trail Creek and diverting its flows to Quarry Creek during operations and to NE Arm Creek after mine closure. In order to construct and operate the TIA, authorizations under the federal *Fisheries Act* are required and the TIA must be designated on Schedule 2 of the MMER. In keeping with DFO policy of maintaining No Net Loss of productive capacity of fish habitat, an appropriate fish and fish habitat mitigation and compensation plan will be required to: i) support a *Fisheries Act* authorization for habitat destruction associated with the construction of the containment dams and ii) compensate for the loss of fish habitat associated with the deposit of tailings into the TIA.

The potential effects of the proposed TIA on fish and fish habitat are discussed below.

The site of the proposed TIA is in a Y-shaped valley. The TIA straddles the watershed divide between Trail Creek and Quarry Creek, with most of the TIA area normally flowing to Trail Creek. Construction of three dams for the TIA will be required at the south, north and northeast arms of the valley. During operations, water from the TIA will be discharged into Quarry Creek and following closure, water will be discharged into the Unnamed Creek below NE dam. The construction, operation and reclamation of the TIA will have potential effects on the hydrology and water quality within Quarry Creek, Trail Creek and within the unnamed wetland and creek system downstream of the proposed NE Dam. The catchment area for Trail Creek will be reduced by almost 62% during operations, and 82% at closure, which will result in a large flow reduction in Trail Creek which flows into Kluea Lake. This in turn is predicted to have minor effects on Kluea Lake, reducing mean annual flows from the lake by 14% and 16% during operations and at closure, respectively. A reduction in the effective catchment area of Trail Creek will result in reduced flows and wetted channel width in the lower reaches of Trail Creek not impounded by beaver dams. These changes are expected to substantially reduce and possibly eliminate effective rainbow trout spawning habitat from Trail Creek. The effect of these flow changes on fish habitat are addressed by compensation measures discussed in Section 7.3.4.

Flows in Quarry Creek will likely increase by a predicted 119% based on mean annual discharge from pre-development conditions during the operational period due to discharges from the TIA. However, the Proponent maintains that estimated runoff based on modelling has been overestimated and that actual runoff and flows in Quarry Creek will be lower than modelled. Depending on the timing of flows released to Quarry Creek

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and the increase in flows over natural rates, effects on certain fish habitats, including possible spawning areas, may result from scouring and/or sediment accumulations.

In the post-closure period, both water quantity and water quality within Quarry Creek are predicted to return to pre-development conditions, as discharges from the TIA will be released from the NE Dam. Water quality in Quarry Creek and NE Arm Creek is required to meet federal MMER and provincial Ministry of Environment (MOE) discharge standards. Based on acute toxicity testing of the pilot mill process water, the discharge of water from the TIA is predicted to not result in short term toxicity to aquatic life. Further assessment will be undertaken during operations as part of the required MMER's Environmental Effects Monitoring (EEM) program to determine whether there is potential for any long-term effects to occur and whether further treatment of TIA discharge water is required.

Flow changes in the creek system downstream of the Northeast Dam (NE Arm Creek) are expected to be small during operation but will increase substantially following closure due to the release of runoff water from the TIA through the permanent spillway at the NE Dam. Water quality in this creek system will not be affected during operations since changes to flows are minimal. However, in the post closure period, the tailings impoundment overflow through the NE Dam is expected to increase the mean annual discharge by 157% and monitoring will be required. As post-closure discharges will be largely natural runoff and treated water from the proposed treatment plant for the overall Red Chris mine development, water quality in the NE Arm Creek flowing from the Red Chris mine development through the TIA is expected to remain near pre-development conditions.

### **7.3.3 Mitigative Alternatives Considered**

#### *Alternative Placement of the Tailings Impoundment Area (TIA)*

Section 1.16.6 of the Application discusses the alternatives assessment of potential TIAs for the Project. Three sites were considered for the TIA; a site located in a valley tributary to Quarry Creek approximately 6 km to the northeast of the proposed open pit; a site within the Quarry Creek Valley at a point immediately downstream of the proposed tailings impoundment; and the proposed site, which extends further south into the Trail Creek drainage basin. The proposed tailings location was selected on the basis of capacity, geotechnical and environmental considerations.

Alternative options for placement of the TIA dams to avoid potential effects on fish habitat were considered. The potential relocation of the South Dam to avoid fish habitat and waters frequented by fish was considered. Design criteria used by the Proponent have attempted to balance the engineering requirements for locating the TIA while minimizing the TIA's effects on fish habitat. The location of the South Dam is based on geotechnical considerations and moving it would not produce a measurable gain in fish habitat protection.

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A series of beaver dams beginning immediately upstream of Kluea Lake present a current barrier to fish passage under low flow conditions. However, sampling in 1995 and 2004 found rainbow trout up to 2.7 km upstream of Kluea Lake. Habitat surveys conducted in 2004 suggested an additional 250m beyond this point as being accessible and therefore potentially fish bearing although no fish have been found in this section of the reach to date. As a result, in order to avoid "waters frequented by fish" the South dam of the impoundment would have to be moved approximately 1800m to the north in Trail Creek. As the valley broadens out at this location, a much larger dam would be required. This would in turn result in a reduction of TIA storage capacity requiring that the dams either be raised or the North dam also be moved north along Quarry Creek a similar distance to keep the dams at the same height. Fish bearing waters have been identified in Quarry Creek approximately 1500m downstream of the North dam. Moving the North dam north by 1800m would therefore put the North dam into "waters frequented by fish" in Quarry Creek. The Proponent has already proposed moving the North dam further north by approximately 800m in order to accommodate additional storage requirements as identified in the Feasibility Study in order to avoid the raising of the dams. This leaves only about 700m in Quarry Creek above "waters frequented by fish". As with Trail Creek, the Quarry Creek valley broadens out to the north requiring a much larger dam further downstream.

At either of the potential locations of the South dam, regardless whether or not it is located within "waters frequented by fish", the effect of the impoundment on the hydrology of Trail Creek remains essentially the same owing to the fact that the impoundment will intercept the majority of the watershed drainage, resulting in a corresponding reduction in stream flow. It is for this reason that the Proponent proposed a Fish Habitat Compensation Plan for fish habitat measured over the entire length of Trail Creek. While beaver dams have limited fish distribution recently to several hundred metres into the TIA site, traditional knowledge indicates that fish once moved considerably further into the TIA site, including Black Lake.

In summary, the South dam of the TIA has been located based on critical geotechnical and long term stability considerations. Moving the South dam to avoid effects to "waters frequented by fish" has ramifications on the overall TIA design and in the final analysis does not achieve a net benefit in terms of reducing effects to fish and fish habitat.

### **7.3.4 Mitigation for Effects to Fisheries and Aquatic Resources**

In their application, the Proponent provided a preliminary conceptual compensation plan to address the loss of fish habitat in Trail Creek, including direct physical loss of habitat, changes in flows, and changes in productivity. This initial proposal was to divert a turbid tributary (named "Turbid Tributary" for EA purposes) to the stream connecting Kluea and Todagin Lakes (named "Kluea-Todagin Creek" for EA purposes) by redirecting the flow of the Turbid Tributary southward to connect with the stream that drains into the north end of Todagin Lake. The redirected tributary would improve water temperatures

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and decrease turbidity in Kluea-Todagin Creek. However, there is some uncertainty with respect to the long term stability of the proposed works and the maintenance requirements. Information to satisfy these concerns is currently not available; however, the Proponent has committed to assess the long term stability of this potential stream diversion.

Subsequently, the Proponent has provided an alternative conceptual fish habitat compensation plan to DFO that can be implemented if the Kluea-Todagin diversion is shown not to be viable based on further data and information collected, or if considered preferable by DFO in consultation with First Nations and MOE. The Coyote Creek Fish Habitat Compensation Plan involves stream channel reconstruction near the outlet of Ealue Lake in an area heavily affected by beaver activity. The channel and attendant bank stabilization and riparian revegetation would provide rearing and spawning habitat, found limiting in the Ealue/Coyote system. The size of the compensation project has been designed to exceed a 2:1 ratio relative to fish habitat losses in Trail Creek. Ongoing beaver management is anticipated to be required through the life of the Project and over the long term in order to maintain these anticipated habitat benefits.

Additionally, the Proponent has agreed to consider other sites proposed by First Nations, providing these sites are acceptable to DFO and MOE. Initial discussions between the Proponent and the Tahltan First Nation indicated that a portion of desired stream channel improvements in Zetu Creek near Iskut warranted further consideration. A Tahltan fisheries technician met with DFO and BC Environment representatives in October 2005 and agreed that habitat improvements on the Zetu Creek site were not a favourable option for the specific purpose of compensation of the Project.

The Proponent has committed to examine other measures to mitigate and/or compensate for other effects on fish habitat from the loss of habitat due to the dam and flow reduction in Trail Creek and the potential loss of productivity in Kluea Lake. For example, effects on the wetlands in Trail Creek will be monitored for unanticipated effects with respect to habitat mitigation and compensation plans for Trail Creek and additional compensation will be provided, if necessary.

To address the question of whether the increased flows to Quarry Creek during operation and post closure will affect fish habitat, the Proponent has committed to collect baseline data and to establish a monitoring program in Quarry Creek to compare fish, invertebrates, nutrients, and flow and water quality prior to disturbance and following construction of the TIA. These data will be assessed to determine whether the construction and operation of the TIA will cause a HADD of fish habitat in Quarry Creek. If so, DFO will require the Proponent to identify offsetting fish habitat mitigation and will require any residual effects on fish habitat to be compensated appropriately in support of the adaptive management approach for this specific habitat component in Quarry Creek.

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### *Summary of Proposed Fish Habitat Mitigation Measures from the Proponent:*

1. Project construction components that have the potential to affect fish habitat will be timed to avoid critical life cycle periods, such as spawning. Works requiring stream crossings will be timed for periods when flow is low or absent to prevent interrupting fish passage and prevent mobilizing sediment;
2. Works requiring stream crossings will conform with the current Fish-Stream Crossing Guidebook (Forest Practices Code of British Columbia, 2002) and DFO's Pacific Region Operational Statements to maintain fish passage and stream ecological functions;
3. The Proponent has committed to have an Environmental Management Plan (EMP), some components of which would be subject to DFO approval in place prior to construction of the Project. Site-specific sediment and erosion control measures will be described in the EMP and implemented as necessary. Adherence to some of these plans would also be required as conditions of a *Fisheries Act* authorization. The EMP would consist of the following component plans:
  - a. Mine Plan;
  - b. TIA Operating Plan;
  - c. Acid Rock Drainage and Metal Leaching Prediction, Collection and Treatment Plan;
  - d. Materials Handling Plan;
  - e. Reclamation and Closure Plan;
  - f. Wildlife Management Plan;
  - g. Sediment Control Plan;
  - h. Pollution Prevention Plan;
  - i. Spill Contingency and Emergency Response Plan;
  - j. Environmental Effects Monitoring Program;
  - k. Waste Management Planning;
  - l. Monitoring Programs as specified; and
  - m. Fish and Fish Habitat Mitigation and Compensation Plan.
4. The Proponent has confirmed that the volume and water quality of periodic water releases from the tailings impoundment will be closely monitored and managed to ensure the protection of aquatic resources in the downstream receiving environment;
5. The Proponent has agreed to develop a Fish and Fish Habitat Mitigation and Compensation Plan that meets DFO Policy objectives in support of a *Fisheries Act* authorization for the construction of the TIA and to offset habitat loss from the deposit of tailings into the TIA;
6. In recognizing the technical feasibility and constraints of their initial fish habitat compensation proposal, the Proponent has identified an alternative proposal to offset fish habitat losses for the construction of the TIA dam and for the deposit of materials into the TIA;

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7. In addition to pre-established mitigation and compensation elements as discussed elsewhere in this report, the Proponent will adaptively manage potential fish habitat and water quantity effects on Quarry Creek, namely to monitor, assess, mitigate and compensate any residual effects on fish habitat from proposed flow releases into Quarry Creek;
8. The Proponent agreed to consider habitat compensation sites on Zetu Creek in the vicinity of Highway 37, as suggested by the Tahltan Central Council as alternatives to the proposed Kluea-Togagin site, subject to these being acceptable to DFO and MOE. Based on field assessment, stream stabilization and habitat development works on Zetu Creek were found to be unsuitable for fish habitat compensation purposes for the Project by DFO, MOE and Tahltan Central Council representatives; and
9. The Proponent has also indicated that they will retain a qualified environmental manager to provide effective, integrated environmental management at the mine site.

The Proponent proposed a water infiltration/intake facility for mill make-up water on the banks of the Klappan River as a contingency should valley wells not provide sufficient volumes. The extraction volumes proposed (~0.03 cms relative to Klappan River low flows of ~6 cms), if needed, are expected to have minimal reductions to Klappan River and minimal impact on its fish and aquatic resources.

### *Fish and Fish Habitat Mitigation and Compensation Plan*

As noted above, compensation will be required to achieve No Net Loss of fish habitat productive capacity to offset the loss of fish habitat in the Trail Creek headwaters, including compensation for the loss of productive capacity in Trail Creek, for deposit of tailings and any reduction in the productivity of Kluea Lake and its outlet stream. In addition to the above, the Proponent has proposed to implement an adaptive management approach to address potential impacts from additional flow releases into Quarry Creek from the TIA and its water diversion ditches, with a decision on fish compensation to be made following further studies and consideration of the effectiveness of mitigation measures to be applied adaptively. In keeping with DFO's Policy of No Net Loss, and as is standard practice, DFO will require a compensation ratio (gain:loss) of no less than 2:1 for the loss of fish habitat as a result of the Project.

In its outline of an alternative compensation plan the Proponent has proposed a concept that is anticipated to meet DFO's Policy of No Net Loss of productive capacity. Selection of a final compensation plan and related details will be subject to further development and consultation at a subsequent stage of review prior to issuance of any authorizations under the *Fisheries Act*. Final compensation requirements of DFO will be determined in consultation with the Proponent, BC MOE and local First Nations prior to authorizations being issued by DFO.

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### **7.3.5 Significance of Effects to Fisheries and Aquatic Resources**

DFO is of the opinion that the potential for a reduction in fisheries resources in Kluea Lake and Trail Creek watershed will be offset by improvement of fisheries resources in the Ealue Lake/Coyote Creek system as a result of the proposed compensation measures. To achieve No Net Loss, the compensation measures in Coyote Creek will involve long-term planning, beaver management, monitoring and maintenance through mine life and throughout the foreseeable future after the mine activity is completed. Compensation requirements for effects to Quarry Creek, if any, will be identified and developed through a separate adaptive management approach through ongoing consultation between the federal and provincial governments, the Proponent, First Nations and the community, with expectations that No Net Loss can be achieved.

Based on the assessment of the information provided, the RAs have determined that with implementation of the proposed mitigation and compensation measures, the Project is not likely to cause significant adverse environmental effects on fisheries and aquatic resources.

### **7.4 Terrestrial Wildlife and Vegetation**

#### **7.4.1 Background to Terrestrial Wildlife and Vegetation**

The Project is within a Wildlife Management Area and has high wildlife values. Wildlife and associated habitat information is found in section 5.1.8 of the BCEAO report, plus sections 4.1.18, 4.2.7 and 6.9 of the Application. Sections 11 and 12 of the Application Supplement describe additional wildlife studies conducted during the summer of 2004 and summarize the broad categories of potential effects on wildlife. Surveys and Terrain Ecosystem Mapping were also conducted across the site.

Section 4.1.17 of the Application describes terrestrial and vegetative resources of the area. The TIA site is within a Spruce-Willow-Birch biogeoclimatic zone. No rare plants or ecosystems were identified within the proposed TIA site.

Moose, grizzly bear, beaver, martin, and waterfowl and their respective habitats within the Project area were assessed during the Red Chris EA. Portions of the proposed TIA site provide high value summer habitat for moose, but relatively low moose usage was found during surveys. Grizzly bear summer and fall feeding habitats were also found in the TIA site, as was evidence of grizzly bear usage. The TIA site supports two beaver colonies.

Western Toad, found within the TIA site, is listed in Schedule 1 of the *Species at Risk Act* (SARA) as a "species of special concern". Although the Western Toad is listed under SARA, its listing is based on populations further south, as the species tends to be

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relatively prolific in this northern region (reference: Response to Western Toad Issue, July 12, 2005).

### **7.4.2 Effects on Terrestrial Wildlife and Vegetation**

The Project will have some effects on wildlife in the vicinity of the TIA, ranging from alteration or destruction of habitat, to the disturbance or displacement of some individuals. Within the Project area, the Application anticipated the following trends of effects:

- moose are expected to experience a potential long-term lowering of available summer feeding habitat in the valley bottom areas due to the proposed tailings dams and impoundment, with an increase in areas designated with "nil" habitat values (e.g. unvegetated substrate) for moose;
- grizzly bear are expected to experience an increase in areas designated with "nil" value habitats for spring feeding during mine life, but would improve on reclamation following mine closure;
- The two beaver dam colonies within the TIA site would be displaced from the TIA site during mine operations, as would mink, waterfowl and western toad, with potential for gradual return after reclamation of the site following mine closure. The Western Toad population in the Red Chris study area is small and a large proportion of the toad habitat in this general region is secure because of nearby protected areas (reference: Response to Western Toad Issue, July 12, 2005).

### **7.4.3 Mitigation for the Effects on Terrestrial Wildlife and Vegetation**

The Proponent has proposed various mitigation measures to eliminate or reduce effects on terrestrial wildlife and vegetation, as found in the Proponent Commitments Table (Reference #C1 to C38 inclusive). Further, the Cassiar Iskut Stikine - Land Resource Management Plan (CIS-LRMP) sets out guidelines to protect wildlife which the Proponent will be expected to follow. The Proponent has considered a number of measures in order to be consistent with the objectives of the CIS-LRMP.

The Western Toad, a wildlife species listed under the *Species at Risk Act* (SARA), has been identified as potentially affected by the Project, and as such EC was notified. The Canadian Wildlife Service (CWS) of Environment Canada provided advice, pursuant to section 12(3) of the *Canadian Environmental Assessment Act* (CEAA), on the Western Toad as it relates to the Project.

The Government of BC concludes in the BCEAO report it is satisfied that the proposed mitigation measures and related commitments (#C20) will prevent or reduce to acceptable levels any potential significant adverse effects.

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### **7.4.4 Significance of the Effects to Terrestrial Wildlife and Vegetation**

As the management of terrestrial wildlife and vegetation species are under provincial mandate and jurisdiction, the RAs also look to the Government of BC for advice as to the significance of effects on these resources. The RAs note that provincial ministers are satisfied with the proposed mitigation measures and the Proponent's commitments to reduce adverse effects to acceptable levels for most of the wildlife species and habitats identified.

The provincial EA Certificate issued to the Proponent on August 24, 2005 lists various conditions to ensure that mitigation measures are implemented to the Government of BC's satisfaction. The RAs also note the information provided in section 5.1.8 of the BCEAO report regarding environmental effects of the Project to wildlife and habitat and the proposed mitigation measures described in the Proponent Commitments Table (Reference #C1 to C38 inclusive).

In reaching a conclusion regarding adequacy of protection measures for the Western Toad, the RAs considered the following information:

- The Canada-British Columbia Agreement on Species at Risk (in particular, section 10.2);
- The August 19<sup>th</sup> letter from Andrew Robinson to Nick Leone;
- The July 21<sup>st</sup> letter to Andrew Robinson from Michael Crowe – in particular its Attachment 2 (Government of B.C.'s Advice on Status of Assessment on Western Toad);
- The August 24<sup>th</sup> signed provincial EA Certificate (M05-02) including Schedule A; and
- The "Summary of Red Chris Development Company Ltd's Commitments".

With respect to the Western Toad, the RAs considered that (1) a condition of the Provincial EA Certificate is that the Proponent must adhere to the conditions outlined in Schedule A, and (2) Schedule A includes the Summary of Commitments that outline how the Proponent proposes to protect the Western Toad and (3) the BC Ministry of Environment and the Canadian Wildlife Service are identified as the Agencies to monitor and track the implementation of those measures to address the Western Toad issue, and (4) should the Proponent fail to adhere to any conditions in the EA Certificate, the certificate will become null and void.

Based on the assessment of the information provided, and in recognition of specialist advice from CWS, and the analysis from the Government of British Columbia reported in the BCEAO report, the RAs have determined the Project is not likely to cause significant adverse environmental effects on terrestrial wildlife and vegetation.

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### **7.5 Climate**

#### **7.5.1 Background on the Climate**

The Project is sited in northern mountainous terrain with attendant high precipitation and cold winters.

#### **7.5.2 Effects on Climate**

Potential effects to climate are primarily related to greenhouse gas (GHG) emissions from fossil fuel combustion occurring as a result of equipment and vehicle use. Section 4.1.2 of the Application and section 5.1.1 of the BCEAO report describe possible effects of the Red Chris mine development to the climate. The construction and operation of proposed TIA, potential water diversion and explosives factory and/or magazine would not likely be major contributors to GHG emissions.

#### **7.5.3 Mitigation of the Effects to Climate**

The RAs understand that project planning and design will be used to reduce or eliminate GHG emissions to the climate. The Proponent has agreed to implement proposed mitigation measures described in Section 5.1.2 (air quality) of the BCEAO report to further reduce residual effects to climatic conditions.

#### **7.5.4 Significance of the Effects to Climate**

The Proponent has committed to reducing GHG emissions to the extent possible. Although GHG emissions related to the Red Chris mine development proposal may contribute to climate change, these were expected to be negligible in comparison with the global GHG emissions and will not likely influence climate change significantly. As such, the considerably smaller contribution of GHG emissions derived from the Project are expected to be limited temporally and spatially. Site weather monitoring and predictions of effects due to climate change can best be accommodated by project planning and design.

With federal expert advice from Environment Canada, the RAs have determined that the Project is not likely to cause significant adverse environmental effects regarding climate change.

### **7.6 Air Quality**

#### **7.6.1 Background on Air Quality**

Air quality in the vicinity of the Project is presently considered good because the concentration of airborne contaminants is low.

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### **7.6.2 Effects to Air Quality**

Potential sources of air-borne contaminants from the Project include the construction and operation of the TIA and the explosives factory. Table 4.5.2 of the Application lists air contaminants generated by construction equipment, drilling, blasting, loading, hauling and grading associated with construction of the tailings dams. The explosives factory also has associated exhaust gases and potential fugitive dust generated during construction by bulldozing, levelling, hammering, lifting and hauling equipment.

### **7.6.3 Mitigation of the Effects to Air Quality**

The Proponent is required to implement the proposed mitigation measures found in section 5.1.2 of the BCEAO Assessment Report to eliminate or reduce adverse effects to air quality. Although no previous air quality data has been collected in the vicinity of the proposed Project site, any new sources of anthropogenic air contaminants will be monitored to ensure that emissions do not exceed the federal Level A air quality objective. The Proponent will be required to apply measures described in the document "Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities" (March 2005).

### **7.6.4 Significance of the Effects to Air Quality**

The Application indicates that there will likely be short-duration and localized environmental effects to air quality continuous over summer construction periods. With the mitigative measures proposed by the Proponent, the residual environmental effects to air quality will be minimized.

With expert federal advice from Environment Canada and specialist advice from the provincial Ministry of Environment, the RAs have determined that the Project, with implementation of proposed mitigation measures, is not likely to cause significant adverse environmental effects to air quality.

## ***7.7 Effects Related to an Explosives Factory and Magazine***

This section describes the major environmental effects and mitigation measures related to the proposed explosives factory/magazine, however specific effects related to the explosive factory/magazine are also considered in other sections of this screening report.

### **7.7.1 Background on Explosives Factory and Magazine**

The Explosives Regulatory Division (ERD) within NRCan provides an Explosive Factory Licence for facilities manufacturing explosives. An explosives factory can be a fixed site for the manufacture of blasting explosives, ammunition or fireworks, etc., or, in the case

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of bulk explosives, it can be the base of operations with the facilities necessary to clean, decontaminate and repair vehicles that support satellite sites, customer sites, and temporary factories from which trials and demonstrations may be conducted and where the manufacture of the product occurs.

The ERD also issues mechanical ammonium nitrate fuel oil (AN/FO) certificates, which are granted to companies producing AN/FO with powered equipment to be discharged directly into a borehole at a specified location, mine or quarry owned by the company to which the certificate is issued.

The Proponent indicated in their October 28, 2004 application for an EA Certificate their intent to use explosives and to locate an explosives factory on the minesite for this Project (as per Section 3.4.9, Explosives Use and Handling in the Application). The Proponent also provided more detailed information to NRCan regarding explosives use and storage pertaining to:

- 1) Maximum quantity of explosives at each facility;
- 2) Specified location, with distances to vulnerable features such as dwellings, roads, camps, etc. for the explosive magazines and ammonium nitrate storage locations specified using the Canadian Modified Quantity Distance (Q-D) Table for Hazard Divisions 1.1 and 1.5; and
- 3) Details regarding any temporary explosive facilities to be used for starting the project.

As indicated by the Proponent, if AN solution is manufactured on-site, four silos with a capacity of approximately 70 tonnes each would be required. If AN solution were to be shipped directly to the site, two silos would be adequate plus two solution tanks of 11,000 gallons each. A 40-60 tonne emulsion silo and a building of approximately 350 m<sup>2</sup> to house the emulsion mix unit, a bay for loading mix units and quality control instrumentation will also be required. Two magazines will be required for storage of detonators and boosters. A maximum of approximately 6000 kg of boosters and 500 kg (10,000 ea at 0.6 kg) of detonators will be stored in approved magazines. Additional infrastructure required will consist of a building of approximately 400 m<sup>2</sup> to serve as a garage for the two delivery units and to maintain a supply of critical spares for facilitating repairs. A small storage shed for raw materials will be required close to the main building.

The Proponent provided a site layout drawing (ref. DWG No. A1-143673-91-C-0002) that shows the proposed locations of the explosives emulsion plant, truck shop facility, ammonium nitrate storage and caps magazine storage (collectively referred to hereafter as the explosive factory and magazine facilities). The facilities are located approximately 400-450m apart and 450-500m north of the ultimate toe of the waste rock storage area, in excess of 1.5 km from the main access road and over 2 km from any dwellings including the mill and campsite facilities. The access road to the explosives factory will be

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restricted to use by explosives personnel and authorized persons only. Each of the facilities will be bermed and will have individual access.

The Proponent has indicated that blasting may be required during construction in rock cuts along the access road and possibly in foundation excavations such as the crusher and mill. In such cases, drilling and blasting will be contracted to a licenced drilling and blasting contractor who will supply all of their own supplies, including storage magazines and blasting agents, as well as acquire any necessary permits and licences. Temporary blasting explosives (pre-packaged, non-bulk type) during construction will be stored on site at the same locations proposed above for the permanent facilities. Blasting requirements during construction are expected to be small and localized, and will therefore not require a significant quantity of explosives storage and use.

### **7.7.2 Environmental Effects Related to Explosives Factory / Magazine**

Environmental effects pertaining to an explosives factory and magazine are general safety concerns, effluent management, waste handling, spill contingency and malfunctions and accidents. The explosives manufacturing (factory) and storage (magazine) facilities were one of the key project components carried through the effects assessment in Section 4.2 of the Application and the potential effects and mitigation measures evaluated in the project impact matrices contained within that section. The explosives factory and magazine facilities were recognized and incorporated into the Spill Contingency and Emergency Response Plan (SCERP) contained in Section 6.12 of the Application.

The proposed locations of the explosives factory and magazine facilities are within the general minesite development area and within the local study areas for baseline surveys relating to wildlife & wildlife habitat, water quality & quantity, meteorology, fisheries & aquatic habitat, archaeology, terrestrial ecosystem mapping, vegetation, soils, rare plants & ecosystems. Baseline data from these surveys were utilized in the assessment of potential effects associated with the explosives factory and magazine facilities.

Based on the results of the effects assessment, the explosives factory and magazine facilities are not predicted to have any significant effects on valued ecosystem components (VEC's) related to the Project.

NRCAN is satisfied that the information supplied regarding the explosives factory and magazine, including spill contingency, waste handling, etc. is acceptable. Further, there were no significant environmental issues raised, or adverse effects identified, during the Red Chris EA with respect to a proposed explosives factory and/or magazine.

### **7.7.3 Alternative Locations**

The Proponent has committed to providing NRCAN with alternative locations for an explosive factory and magazine as part of the formal application process for an Explosives Factory Licence from ERD. Although the footprint of an explosives factory and magazine facilities are very small, alternative locations will provide flexibility in

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determining a location for the factory and magazine that avoids and/or minimizes environmental effects while meeting NRCan's ERD safety specifications.

### **7.7.4 Mitigation Measures for Explosives Factory and Magazine**

The explosives factory and magazine facilities were recognized and incorporated into the Spill Contingency and Emergency Response Plan contained in Section 6.12 of the Application. Further, the Proponent will be required to meet certain typical standard conditions to mitigate environmental effects and reduce the potential of malfunctions and accidents. Such standards and conditions include:

1. Construction of the explosives factory and explosives magazine will be in accordance with NRCan's ERD specifications and standards;
2. The explosives factory and explosives magazine shall be bullet proof, fire resistant, theft resistant, weatherproof and well ventilated;
3. To prevent spills or leaks from any above ground fuel tanks, they shall be dyked in accordance with subsection 4.3.7 of the National Fire Code of Canada 1995;
4. A specific section on explosives must be part of the written Emergency Response Plan, and shall be prepared in accordance with CAN/CSA-Z731-95;
5. Sweepings and contaminated wash water from the explosives factory shall be collected and disposed of in a manner which will have minimal impact on the receiving environment. Water gel/slurry or emulsion explosive residue or wastes from the explosives factory shall not be discharging directly into the receiving environment;
6. Operation of the explosives factory and/or magazine must ensure compliance with Section 36 of the *Fisheries Act* which prohibits the deposit of a deleterious substance into waters frequented by fish or in any place under conditions where a deleterious substance may enter such waters; and
7. Reporting requirements for the National Pollutant Release Inventory (NPRI) program through Environment Canada as it may apply to the factory site.

### **7.7.5 Residual Environmental Effects of Explosives Factory/Magazine**

Implementation of these mitigation measures, proper management and operation of the explosives factory/magazine will minimize any adverse environmental effects (including those potentially caused by malfunctions and accidents) to the receiving environment from an explosives factory and magazine at the Red Chris minesite. There are no significant residual environmental effects associated with the explosives factory and magazine facilities for this Project.

### **7.7.6 Significance of Effects related to Explosives Factory / Magazine**

The RA's have determined that with implementation of the mitigation measures outlined, the proposed explosives factory and magazine at the Red Chris mine is not likely to cause significant adverse environmental effects to the receiving environment.

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### **7.8 *Effects Associated with Project Related Malfunctions and Accidents***

#### **7.8.1 Background to Malfunctions and Accidents**

Pursuant to paragraphs 16(1)(a) and (b) of the CEAA, the RA's reviewed the environmental effects (and their significance) of malfunctions or accidents that may occur in connection with the Project. Environmental effects can result from the spill or accidental release of a chemical, reagent, petroleum product or process material (ore, tailings, and/or concentrate) onto the land or water that can cause harm to water quality, vegetation, and/or the health or well being of humans, animals or aquatic life. Section 6.15 of the Application provides an assessment of the potential for accidents and malfunctions during construction, operation and following closure. Table 6.15.1 of the Application lists the potential effects from malfunctions associated with the Red Chris development proposal and the mitigation measures proposed to address the potential for effects.

The potential effects and mitigation of tailings dam failures are discussed separately in Section 7.8.4 of this report.

#### **7.8.2 Assessment of Malfunctions and Accidents**

The following sections provide details on the potential effects of accidents and malfunctions associated with the Project.

##### **7.8.2.1 *Construction Period***

Construction activities associated with the TIA, water diversion system and explosives factory and/or magazine may increase the risk of spills from petroleum products due to accidents or malfunctions during refueling or servicing of construction equipment, such as dozers, excavators, dump trucks, where refueling is taking place in the field.

##### **Proposed mitigation by the Proponent**

1. Procedures will be developed and implemented as a term of contract for all site contractors to regulate where and how field refueling and servicing activities are to occur. Procedures will restrict where refueling can take place to avoid spills into water bodies;
2. The Proponent will maintain a supply of spill response and clean up equipment on site throughout the various construction sites; and
3. The Proponent will employ a site-based environmental supervisor during construction to monitor contractor performance and ensure suitable environmental precautions are being employed and standards followed.

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Further, in keeping with Best Management Practices in this regard, the Proponent would conduct training on knowledge and emergency preparedness measures to ensure appropriate implementation of the above.

### **7.8.2.2 Operations Period**

During operations of the TIA, water diversion system and explosives factory, the risk of accidents and malfunctions may extend to the possible release of chemicals, reagents, petroleum products, concentrates, process water and tailings slurry.

To mitigate the potential risk, and consequences of, accidents and malfunctions related to the Project, the Proponent will develop, maintain and implement emergency response and spill contingency training, equipment and materials at the site. The Proponent has proposed to site tailings pipelines to drain any spills to the TIA.

Diversion ditches constructed on the sidehills above the proposed TIA may fail, releasing runoff water into the TIA. The consequential effect of a sudden decrease in diversion channel flows to Quarry or NE Arm Creeks would cause a decrease in fish habitat in these streams, temporally buffered by wetlands and stream channel between the proposed point of release of diversion ditch water and the furthest upstream point of fish utilization. The resultant flows would more closely match the natural flows in these streams without the additional diversion water, and not pose a large threat to fisheries resources. The additional water in the TIA (that may result from failure of the diversion ditches) may cause a larger volume of excess water to be released from the TIA.

Potential mitigation for diversion ditch failure may employ, among other measures, regular monitoring and maintenance, and rapid repair of the diversion ditches should they breach. The Proponent proposes to reclaim the diversion ditches on mine closure and thereby alleviate this issue at that time, with all TIA flows diverted through a spillway to be constructed through NE Arm dam at mine closure.

See Section 7.9 in this report regarding effects of the environment on the Project from potential overtopping of the TIA during flood events.

### **7.8.2.3 Post Closure Period**

During the post closure period, site activity and the risk of accidents and/or malfunctions will decrease significantly. Once the initial site reclamation has been completed, site activity will be limited to environmental inspection and monitoring; periodic maintenance and operation of the proposed water treatment facilities.

#### **Proposed mitigation by the Proponent**

1. Access to the site will be restricted; and

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2. Emergency response and spill contingency training will be conducted and supplies will be kept on site in appropriate quantities to deal with potential spill incidents.

The Proponent noted that, whether site restoration is required will depend on the nature of the spill or other emergency and the substances involved. In any spill scenario, the spill will be promptly reported as required and the Proponent will work closely with the regulatory agencies to determine the extent of restoration required and the monitoring required and verify the success of such restoration. If site restoration is an issue, it will be undertaken within the framework of the Canadian Soil Quality Guidelines.

It was noted that the SCERP is a conceptual plan that will be updated prior to construction and operations. Training will be on several levels: all employees, mine safety and rescue personnel and hazardous incident first responders. Training programs will be finalized and implemented prior to mine construction and operations.

### **7.8.3 Malfunctions and Accidents – Mitigation & Contingencies**

The Proponent identified the potential for malfunctions and accidents and made it an integral component of the SCERP plan for the overall Red Chris mine development proposal. An important aspect of the SCERP is training, which the Proponent has indicated will be conducted on several levels, such as: all site contractors and employees, mine safety and rescue personnel and hazardous incident first responders. Training programs will be finalized prior to mine construction and operations. Furthermore:

1. The Proponent has proposed to maintain a supply of spill response and clean up equipment on site throughout the various periods of construction, operation, closure & post-closure;
2. The Proponent has proposed to employ a site-based environmental supervisor during all project phases to monitor performance and ensure suitable environmental precautions are being employed and standards followed; and
3. The Proponent has proposed to write an Emergency Response Plan. Within this plan there will be detailed measures to address Explosives Factory and Magazine issues as per section 7.7 of this report.

Environmental effects to land and water will be mitigated by the Proponent through implementation of design and operational practices, including training, to first prevent accidents and/or malfunctions from occurring, and secondly to minimize the consequences of such events. However, it is recognized that accidents and malfunctions are likely to occur and that some effects may result. The RAs concur that in most cases these incidents will be of short duration, of low probability and will have a low frequency of occurrence. Therefore, the overall effects of malfunctions and accidents described above are likely to be minor and manageable.

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### **7.8.4 Malfunctions and Accidents - Tailings Dams Failure**

#### **7.8.4.1 Background on Tailings Dams Failure**

Development of the Project involves construction of three dams defining the proposed TIA and additional dams containing seepage ponds.

Section 3.4.3 of the Proponent's Application describes the assessment of the geotechnical stability of the tailings dams. These assessments are based on the Knight Piesold Ltd (2003) and AMEC Geotechnical Investigations Report (2004) studies. All the structures are designed to conform to published guidelines, including Dam Safety Guidelines, Canadian Dam Association, and BC Dam Safety Regulations.

Section 4.1.8 of the Proponent's Application provides an overview of the geological setting of the Project and of the geotechnical assessment work conducted to date, and describes the terrain mapping of the Project site and surrounding area which was completed by AMEC in 2004. Terrain analysis included the identification of geomorphological processes, some of which may be associated with geological hazards. The proximity of the proposed mine infrastructure to these mapped features was assessed to determine whether naturally occurring geomorphological processes could pose risks to them.

#### **7.8.4.2 Assessment of Seismic Conditions and Tailings Dams Failure**

A tailings dam failure could cause environmental and health effects. Potentially, an uncontrolled tailings slurry release from dam failure down Quarry Creek or Northeast Arm Creek could deposit ARD-generating and metal-leaching tailings throughout these systems and into Klappan River, with effects on fisheries, wildlife and vegetation. Failure of the Trail Creek dam similarly could see the deposit of ARD-generating and metal-leaching tailings throughout the Trail Creek valley and into Kluea Lake, affecting fisheries and wildlife resources of that system. Seepage dam failures would potentially cause short-term release of contaminated seepage water into these systems. Accordingly, efforts to prevent dam failures from occurring are paramount to the design and review process.

The Red Chris site is located in an intra-plate region of British Columbia (the North American tectonic plate) that is characterized by very low historical seismicity. The site is located within the western region as defined by the 4<sup>th</sup> generation seismic hazard model for Canada that is to be incorporated in the 2005 update of the National Building Code of Canada (NBCC).

Section 4, Volume 11 of the Proponent's Application provides an overview of regional seismicity data. The Red Chris site is well distant of any significant clusters of recorded earthquakes, with the nearest known active fault being the Queen Charlotte fault zone located about 250 km west of the site.

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The low historical seismicity and tectonic quiescence (stability) of the region of the Red Chris mine site are reflected in the relatively low peak ground acceleration (PGA) values obtained in a probabilistic seismic hazard assessment for the site carried out by the Pacific Geoscience Center, Geological Survey of Canada, NRCan.

The following dam design features were included to increase the dam stability and tolerance to deformation:

- a) Low permeability, compacted till core; and
- b) Wide, above water tailings beaches separating the North Dam and the South Dam from the closure water pond.

### **7.8.4.3 Mitigation to Prevent Tailings Dams Failure**

To satisfy the terrain stability concerns the Proponent will undertake additional geotechnical and hydro-geological field investigations during the detailed design phase of the Project in order to ensure that all facilities are located a safe distance from any areas of potential instability and designed to be as stable as possible

The Proponent advises that the Red Chris site has the lowest ground motions outside of the portion of Canada designated as "stable". Also, there is a lack of recorded seismicity in the area and there are no apparent significant active faults in the vicinity of the site. Overall, the assessment by the RAs revealed no important seismic hazards related to the location and/or operation of this project.

### **7.8.4.4 Significance of Tailings Dams Failure**

Further to section 5.1.3 of the BCEAO report regarding environmental terrain stability, seismic conditions and proposed mitigation measures, the Project structures will be designed to conform to criteria found in published guidelines, such as:

1. Dam Safety Guidelines from the Canadian Dam Association;
2. Investigation and Design of Mine Dumps, Interim Guidelines, and BC MEMPR; and
3. BC Dam Safety Regulations.

With expert federal advice obtained from NRCan and specialist advice from the provincial Ministry of Energy, Mines and Petroleum Resources, the RAs are of the opinion that the likelihood of tailings dam malfunctions would be remote and would be designed to fall within current standards defining acceptable levels of risk.

### **7.8.5 Significance of Malfunctions and Accidents**

The RAs and Environment Canada (as a federal authority) have considered possible effects of likely malfunctions and accidents. The RAs are satisfied that, with the proposed

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SCERP and implementation of the mitigation measures to prevent or manage effects, potential malfunctions or accidents associated with the Project will not likely cause significant adverse environmental effects.

### ***7.9 Effects of Environmental Changes Caused by the Project***

The following four subsections consider the effects of changes that the Project may cause in the environment on i) health and socio-economic conditions; ii) physical and cultural heritage; iii) the current use of lands and resources for traditional purposes by aboriginal persons; and iv) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

In keeping with the CEAA definition of "effects", for these four environmental factors this screening considers only effects of environmental changes expected from the Project (e.g. altered hydrology, relocated fisheries productivity, altered water quality, displaced wildlife, tailings deposit, etc) on these four environmental factors.

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### **7.9.1 Effects on Health and Socio-Economic Conditions**

The scope of factors considered in the screening is limited to effects on health and socio-economic conditions caused by environmental changes from construction, operation and reclamation of the proposed TIA facility, its associated water diversion ditches and fisheries compensation measures, and by the proposed explosives factory and/or magazine. The environmental effects of these components discussed in this review include:

1. Loss of aquatic habitat within the footprint of the proposed dams and TIA and in lower Trail Creek and associated reduction in fish resources of Kluea Lake and waterfowl;
2. Development of fish compensation measures in Coyote Creek and associated increase in fish resources of Ealue Lake;
3. Altered water quality and flows in Quarry and NE Arm Creek, and through seepage into lower Trail Creek and Kluea Lake;
4. Loss of terrestrial habitat within the footprint of the proposed TIA and associated reduction in moose, grizzly bear, beaver and marten;
5. Noise and dust production from the TIA; and
6. Localized air contaminants emanating from the proposed explosives factory.

Of those, potential environmental effects from the Project on health relate to human consumption of fish and wildlife containing elevated metals, drinking of contaminated water and inhalation of air contaminants. The Tahltan also raised issues regarding potential human health effects related to the Project, such as:

1. Effects of air quality on hunting campsites from dust from TIA activities;
2. The potential for contaminants from the TIA entering the food chain and affecting the health of those who hunt, and gather berries, and medicinal plants.

Potential effects of environmental changes from the Project on socio-economic conditions were identified:

1. Lost opportunity to hunt moose in Trail Creek valley;
2. Reduced trapping opportunity in Trail Creek valley;
3. Lost guiding opportunity in Trail Creek valley; and
4. Reduced opportunity for subsistence fishing in Kluea Lake.

#### **7.9.1.1 Mitigation of Effects on Health and Socio-Economic Conditions**

As part of proposed mitigation, the Proponent will ensure that federal water and air quality standards are met (as per the Proponent Commitments Table), thereby reducing the risk of potential contaminant uptake. Monitoring programs will be implemented.

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Further, the Proponent entered into a Memorandum of Understanding (MOU) with the Iskut First Nation, Tahltan Band Council and the Tahltan Central Council to help address effects to health and socio-economic conditions. Consultation and input from the First Nations will continue throughout the life of the Project to address and mitigate effects to health and socio-economic conditions. The Proponent is committed to honouring provisions of the MOU as well the Proponent Commitments Table that outline proposed mitigation for health and socio-economic effects.

The Government of BC concludes in the BCEAO report it is satisfied that the proposed mitigation measures and related commitments will prevent or reduce to acceptable levels any potential significant adverse effects on health and socio-economic conditions.

### **7.9.1.2 Significance of Effects on Health and Socio-Economic Conditions**

Health Canada, as an expert federal authority, is satisfied that all major potential health issues related to the Project were addressed in the EA process. The RAs conclude that with the water and air quality standards being met, the monitoring programs implemented, along with the successful implementation of proposed mitigation measures identified in the MOU and the Proponent's Commitments Table, the Project is not likely to cause significant adverse environmental effects on health conditions.

The RAs find that potential effects resulting from the displacement of fishing from Kluea Lake to Ealue Lake will be mitigated through the opportunity for increasing fisheries resources of Ealue Lake, which has easier access than Kluea Lake, and through proposed habitat compensation measures in Coyote Creek. As for the effects to hunting, trapping and guiding resources, the RAs considered advice from CWS and analysis from the Government of BC found in sections 5.2 and 5.4 of the BCEAO report.

In consideration of the analysis from the Government of BC reported in the BCEAO report and taking into account the proposed mitigation measures, the related commitments made by the Proponent and proposed compensation, the RAs conclude that the Project is not likely to cause significant adverse environmental effects on socio-economic conditions.

### **7.9.2 Effects on Physical and Cultural Heritage Values**

Changes in the environment caused by the Project have the potential to result in a loss or disruption of First Nations cultural heritage values in the trail network and hunting and trapping heritage values offered in the Trail Creek valley.

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### **7.9.2.1      *Mitigation of Effects on Physical and Cultural Heritage Values***

As noted above, the Proponent entered into an MOU with the Iskut First Nation, Tahltan Band Council and the Tahltan Central Council to also address effects to physical and cultural heritage values. Consultation and input from the First Nations will continue throughout the life of the Project to address and mitigate effects to physical and cultural heritage values.

The Proponent is committed to honouring provisions of the MOU as well the Proponent Commitments Table that describes proposed mitigation for effects to physical and cultural heritage values.

The Government of BC concludes in the BCEAO report it is satisfied that the proposed mitigation measures and related commitments will prevent or reduce to acceptable levels any potential significant adverse effects on physical and cultural heritage values.

### **7.9.2.2      *Significance of Effects on Physical and Cultural Heritage Values***

The RAs considered the analysis from the Government of British Columbia in the BCEAO report, and conclude that the Project is not likely to cause significant adverse environmental effects on physical and cultural heritage.

### **7.9.3 Effects on the Current Use of Lands and Resources for Traditional Purposes by Aboriginal Persons**

Assessment of the traditional uses in the Project area was provided in the Proponent's Application Addendum Section 13, which included a report entitled "Results of an Archaeological Impact Assessment and Aboriginal Areas of Interest Study for the Red Chris Mine Development Project in the Northwest Region of British Columbia".

The report, developed through consultation with Tahltan elders, identified various traditional uses, including some within the site proposed for the TIA. Access to the area was provided by an extensive trail network system, with the main trail artery running through the valley bottom connecting the Kluea and Coyote valley systems. Various camps were identified within the TIA site near Black Lake, which served as launching points for hunting and trapping expeditions in surrounding areas through various game trails. The elders identified that rainbow trout in Black Lake once supported a subsistence fishery, possibly at a time of more extensive beaver trapping and fewer beaver dams which could have enabled fish access between Kluea and Black Lakes.

The proposed TIA will flood and bury Black Lake and upper Trail Creek valley and would adversely affect future use of these resources. The valley could be rendered

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unsuitable for these traditional purposes during construction and operations of the mine, and potentially into the post-closure period.

### **7.9.3.1      *Mitigation of Effects on the Current Use of Lands and Resources for Traditional Purposes by Aboriginal Persons***

Fisheries compensation measures proposed by the Proponent in Coyote Creek are expected to offset the loss of fish habitat in the Trail Creek/Kluhea Lake system. DFO does not expect the camp at the south end of Ealue Lake to be adversely affected by the proposed fisheries compensation works on adjacent Coyote Creek for more than a few weeks during construction. DFO will consult with First Nations and BC Environment in the development of a detailed Fish and Fish Habitat Mitigation and Compensation Plan.

As noted above, the Proponent entered into an MOU with the Iskut First Nation, Tahltan Band Council and the Tahltan Central Council to address effects to the current use of lands and resources for traditional purposes. In addition to the MOU, additional measures are described in the Proponent Commitments Table to mitigate potential effects on the current uses of land and resources for traditional purposes by aboriginal persons.

The Government of BC concludes in the BCEAO report it is satisfied that the proposed mitigation measures and related commitments will prevent or reduce to acceptable levels any potential significant adverse effects on current use of lands and resources.

### **7.9.3.2      *Significance of Effects on the Current Use of Lands and Resources for Traditional Purposes by Aboriginal Persons***

Based on mitigation and compensation measures to protect fisheries resources identified above and the analysis of the Government of BC in the BCEAO report, the RAs conclude that the Project is not likely to cause significant adverse environmental effects on current use of lands and resources for traditional purposes by aboriginal persons.

## **7.9.4 Effects on Archaeological Sites**

Assessment of the archaeological values in the proposed Project area was provided in the Proponent's Application Addendum Section 13 which included a report entitled "Results of an Archaeological Impact Assessment and Aboriginal Areas of Interest Study for the Red Chris Mine Development Project in the Northwest Region of British Columbia". Within the Project area, the report noted "much of the Tailings Pond Area was also deemed to have a high to medium potential for containing archaeological evidence of past aboriginal land-use and occupation." Twelve locations tested with sub-surface surveys found limited archaeological records.

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### ***7.9.4.1 Mitigation of Effects on Archaeological Sites***

The Proponent is committed to honouring provisions of the MOU and has identified further mitigation measures in the Proponent's Commitments Table to mitigate for effects on archaeological sites. As well, the Proponent has committed to a limited program of archaeological excavation and further consultation with Iskut and Tahltan First Nations.

The Government of BC concludes in the BCEAO report it is satisfied that the proposed mitigation measures and related commitments will prevent or reduce to acceptable levels any potential significant adverse effects on archaeological sites.

### ***7.9.4.2 Significance of Effects on Archaeological Sites***

Based on analysis of the Government of BC in the BCEAO report, the RAs conclude that the Project is not likely to have significant adverse environmental effects on archaeological sites.

## ***7.10 Effects of the Environment on the Project***

### **7.10.1 Background to Effects of the Environment on the Project**

The RAs determined that the following three major effects of the environment on the Project would be included in this EA:

1. Effects of climate change on the Project;
2. Effects of geological hazards on the Project; and
3. Effects of flooding hazards on the Project.

### **7.10.2 Effects of Climate Change on the Project**

Climate changes may include increases in average annual and minimum temperatures in the Northern Boreal Mountains. The following factors relate to the Project in this regard:

1. The Project makes no reliance on permafrost or frozen ground conditions for geotechnical stability considerations and consequently the potential for warming temperatures associated with climate change would be expected to have no direct impact on geotechnical foundation conditions;
2. At the latitude and elevation of the proposed project, climate change in the form of global warming would most likely be expected to result in more precipitation falling as rain rather than snow, earlier spring freshets, longer summers and later fall freeze-up. Total precipitation would likely not change to any great extent;

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3. The Proponent has used conservative estimates of precipitation for its assessment (i.e., precipitation is likely overestimated). As a result, the potential variability in precipitation events associated with global warming are likely well within the predicted precipitation values; and
4. The key components of the Project design with the potential to be impacted by climate change are the water management structures, such as spillways and diversion ditches. In each case standard engineering practices will include engineering standards to be built into the design such that structures would be capable of passing extreme storm events. As a result, the potential changes associated with climate change are likely within the acceptable safety factors afforded by designing for probable maximum events.

### **7.10.3 Effects of Geological Hazards on the Project**

As discussed in Section 7.8.4 of this report, the RAs are satisfied that potential geological terrain hazards were mapped and air photo interpretation and terrain analysis methods were used to assess the potential for geological hazards with respect to the TIA.

Potential for debris flows and sediment generation is low. Further, surveys found no evidence of potential mass movement or slope instabilities and no significant seismic hazards within the Project area.

### **7.10.4 Effects of Flooding on the Project**

The Proponent used conservative estimates for precipitation and accordingly designed its facilities with greater than standard capacity to manage water. RAs have considered the unlikely scenario of the project receiving more water than it is designed to handle during construction, operations, and post-closure periods.

In consideration of conservative designs, in the unlikely scenario during the construction period of potential excess water overtopping of the construction coffer dam on Trail Creek, the completion of the South tailings impoundment dam on Trail Creek would necessarily need to be completed in wet conditions rather than in the dry. This would result in the Proponent employing further measures as discussed below.

As proposed mitigation, the coffer dams would be designed and constructed to handle the volume of runoff for their catchment area over the period of time that they are intended to be in service and in order to contain the desired volume of water necessary for mill start-up. A spillway will be constructed around one of the coffer dams to prevent overtopping the coffer dams themselves. The spillway would be designed to pass an appropriate flood event to be determined at a subsequent stage of review (such as a 1:200 year Probable Maximum Precipitation (PMP) storm event). The spillway will be armoured with riprap or have other such measures incorporated into the design to avoid and minimize erosion.

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In addition, sediment control ponds will be constructed downstream of the coffer dams to capture runoff and contain sediment mobilized during construction. Other measures such as silt fences, hay bales, rip-rapping, flocculent settling aids will also be employed as may be required.

To the extent practical, borrow materials for construction of the coffer dams will be sourced from within the coffer dam impoundment area in order to contain the area of disturbance and facilitate erosion control by use of the sediment control ponds noted above. These concepts for erosion control during construction of the coffer dams will also apply to construction of the main tailings dams.

During operations the Proponent plans to control the water level in the TIA by pumping excess water to Quarry Creek via a spillway or pipeline. The Proponent anticipates some change to water quality of Quarry Creek during these releases but they expect to remain compliant with water quality requirements. Proposed mitigation includes timing the discharge of excess water to coincide with high flow periods to dilute the effects of the discharge, as well as erosion control measures such as rip-rapping and velocity control barriers as appropriate.

For the period of post-operations, a closure spillway will be designed at a subsequent review stage to pass the Probable Maximum Flood (PMF) storm event. It would be constructed around one of the dams in order to minimize the potential for overtopping and ensure the integrity of the dams over the long term. The Proponent's application proposed to construct this spillway around the NE Arm dam (about 10m high) and design it as a water retaining dam (as opposed to the North and South dams that will be in the order of 80m in height and have tailings beaches on the upstream side to enhance stability). The long term stability of the spillway would be enhanced by the proposed use of the shorter dam.

The increased flows in NE Arm Creek could cause channel stability to decrease, resulting in potential formation of debris jams and additional sediment release throughout the NE Arm Creek to Klappan River. The channel slope and configuration do not appear conducive for debris torrents to form. By way of further mitigation, including erosion control/channel construction/stabilization is proposed for NE Arm Creek particularly at the top end to contain the flow within the area where the channel is currently less well-defined.

### **7.10.5 Significance of Effects of the Environment**

The RAs are satisfied with the results of the assessment of the effects of the environment on the Project, and the proposed mitigation measures. Accordingly, the RAs conclude that climate change, geological hazards and flooding will not likely cause significant adverse environmental effects on the Project.

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### **7.11 Alternatives Considered**

Alternatives considered pertaining to the Project include location of the TIA and its water management facilities. Alternatives to the TIA location are discussed in Section 7.3.3 in this report.

There was discussion during the EA about locating the post-closure TIA spillway from the proposed NE Arm Creek to Quarry Creek or possibly returning the flow to Trail Creek. Currently, the importance of avoiding elevated potential for water quality effects on Kluea Lake and larger fisheries values of Quarry Creek support use of NE Arm Creek for post-closure discharge from the TIA. However, the relative merits of these options would be subject to further examination over the life of the mine before a final decision is made.

### **7.12 Cumulative Environmental Effects**

#### **7.12.1 General Background and Methodology**

The RAs considered cumulative residual environmental effects, measures to mitigate those effects and the significance of those effects that are likely to result from the Project in combination with other projects or activities that have been or will be carried out.

The methodology for the Cumulative Effects Assessment (CEA) follows the Canadian Environmental Assessment Agency's 1999 Cumulative Effects Assessment Practitioners Guide and associated Operational Policy Statement.

#### **7.12.2 Cumulative Environmental Effects Boundaries**

The CEA included the construction, operation, closure and post closure periods of the Project. For the purposes of the CEA, the potential environmental cumulative effects (many that are temporary) associated with current or reasonably foreseeable projects and activities located within the Cassiar Iskut – Stikine Land and Resource Management area were considered as:

1. Current and proposed Red Chris Mine Project (ie., components not included in the federal Project, such as the mine pit, waste dumps, mill, infrastructure, etc., and potential temporary and long term shutdown during mine life);
2. Current and proposed Galore Creek Project;
3. Current and proposed Forrest Kerr Hydroelectric Project;
4. Existing Tom McKay Lake Waste Rock and Tailings Project;
5. Current and proposed Kemess North and existing Kemess South Projects;
6. Current and proposed Kutcho Creek Project;
7. Current and proposed Mount Klappan Project;

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8. Current and proposed Sustut Copper Project;
9. Current and proposed Stronsay Lead/Zinc Project; and
10. Ongoing mineral exploration activity in the region.

In addition, the effects on the communities of Dease Lake, Bob Quinn and Iskut; the highway effects of Highway 37 and the Ealue Lake Rd and the local guide outfitter were considered.

### **7.12.3 Cumulative Environmental Effects Assessment**

The environmental effects assessment in Sections 7.1 through 7.11 of this report identified the following residual environmental effects from the Project:

1. Loss of fish and aquatic habitat in the Trail Creek system;
2. Loss of inlet-spawning rainbow trout stock in Kluea Lake;
3. Gain of fish habitat in Coyote Creek;
4. Gain of rainbow trout stock in Ealue Lake;
5. Water quality degradation in Trail Creek, Quarry Creek and NE Arm Creek;
6. Short-term sediment release in Coyote Creek from construction of fish compensation activities;
7. Altered flow regime in Trail Creek, Quarry Creek and NE Arm Creek;
8. Loss of waterfowl habitat in Trail Creek/Black Lake system;
9. Displacement and temporal loss of moose, grizzly bear, beaver, marten and western toad habitat in Trail Creek valley;
10. Loss of hunting, trapping and guiding opportunities in Trail Creek valley;
11. Loss of traditional uses in Trail Creek valley (trail, camps, hunting, trapping);
12. Loss of archaeological sites in Trail Creek valley;
13. Dust production from the TIA; and
14. Localized air contaminants from the explosives factory and/or magazine.

Linkages of the above residual effects from the Project to other activities and projects are summarized in Table I.

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**Table 1. Cumulative Environmental Effects Assessment Matrix for the Project**

<b>Residual Effects from the Project</b>	<b>Other Overlapping Activities</b>	<b>Linkage</b>
1. Loss of fish and aquatic habitat in the Trail Creek system	none	none
2. Loss of inlet-spawning rainbow trout stock in Kluea Lake	Iskut village	Fishing pressure
3. Gain of fish habitat in Coyote Creek	Ealue Lake Road	none
4. Gain of rainbow trout stock in Ealue Lake	Ealue Lake Road, Red Chris Mine, Mount Klappan Project, Iskut village	Fishing pressure in Ealue Lake
5. Water quality degradation in Trail Creek, Quarry Creek and NE Arm Creek	Red Chris Mine	Incremental degradation in these systems from minesite drainage through proposed tailings facility
6. Short-term sediment release in Coyote Creek from construction of fish compensation activities	Ealue Lake Road	Sediment release from road construction and use
7. Altered flow regime in Trail Creek, Quarry Creek and NE Arm Creek	Red Chris Mine	Diversion of drainage water from waste dump(s) into tailings facility
8. Loss of waterfowl habitat in Trail Creek/Black Lake system	None	none
9. Displacement and loss of moose, grizzly bear, beaver and martin habitat in Trail Creek valley	Red Chris Mine; guiding, hunting, trapping, Ealue Lake Road; Mineral exploration activity in the region.	Incremental displacement of local grizzly bear, moose, beaver and martin populations
10. Loss of hunting, trapping and guiding opportunities in Trail Creek valley	Red Chris Mine	Incremental displacement of local wildlife stocks

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11. Loss of traditional uses in Trail Creek valley (trail, camps, hunting, trapping)	Red Chris Mine; Mineral exploration activity in the region.	Incremental loss of traditional camps, trails, hunting, trapping within Tahltan/Iskut traditional territory
12. Loss of archaeological resources in Trail Creek valley	Red Chris Mine; Mineral exploration activity in the region.	Potential for incremental loss of archaeological resources
13. Dust production from the tailings impoundment facility	Red Chris Mine	Incremental dust production
14. Localized air contaminants from the explosives factory and/or magazine	Red Chris Mine	Incremental air-borne contaminants
15. Exhaust emissions	Red Chris Mine; Highway 37; Ealue Lake Road	Incremental exhaust emissions

### Discussion:

The CEA in the Proponent's Application indicated that only cumulative effects on wildlife are predicted to have the potential to be measurable and that these effects are predicted to be minor. The Proponent's Application does not differentiate between effects on moose and grizzly bear habitat in the Project area from effects on these and other wildlife resources anticipated from the Red Chris mine development proposal, however, the effects are predicted to occur at the species individual level rather than the species population level and are expected to be low to moderate. Any detectable effects will be reviewed as part of the proposed wildlife management plan and actions will be developed to improve mitigation as required through the BC EA Certificate. The Government of BC concluded in the BCEAO report it is satisfied that the proposed mitigation measures and related commitments will prevent or reduce to acceptable levels any potential significant adverse cumulative effects.

If water quality monitoring of runoff from the pit, waste rock dumps and/or TIA indicates a need, the Proponent will be required to construct a water treatment plant to bring mine and TIA runoff in compliance with regulatory water quality standards under a BC *Environmental Management Act* permit and MMER. Effluent from this treatment plant may be directed into the TIA. Additional EEM downstream of the TIA will be used to ensure compliance of the cumulative discharge from the Red Chris development and TIA with regulatory standards.

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### **7.12.4 Significance of Cumulative Environmental Effects**

In determining the significance of cumulative environmental effects, the RAs considered the following:

1. Concerns raised by the Tahltan and Iskut First Nations and summarized in TCC's July 14, 2005 letter to the BCEAO;
2. Findings of the cumulative effects assessment in the Proponent's Application;
3. Detailed commitments made by all parties in the MOU between the First Nations and the Proponent;
4. The Proponent's Commitments Table; and
5. Analysis by the Government of BC in the BCEAO report.

The RAs find that the Project is not likely to cause significant adverse cumulative environmental effects on water quality, fisheries resources, and waterfowl (and traditional uses of them).

Based on the analysis by the Government of BC in the BCEAO report the RAs conclude that the Project is not likely to have significant adverse cumulative environmental effects on terrestrial wildlife and vegetation (and associated traditional uses).

## **8.0 Follow-Up**

The RAs have determined that a follow-up program under CEAA is not considered appropriate for the Project. The proposed Project does not involve technology or mitigation measures that are new or unproven and it is anticipated that the proposed mitigation measures will address the predicted environmental effects. Furthermore, the residual adverse environmental effects of the Project have been identified and are unlikely to be different than predicted in the EA.

## **SCREENING REPORT for the RED CHRIS MINE PROJECT**


Letter dated Mar 1/05 from Rennie Tupper (NRCan) to Garry Alexander (EAO)  
regarding their responses to the Proponent's responses to their original comments;  
Fax letter dated Feb 23/05 from Stephen Sheehan (EC) to Dave Carter (CEAA) &  
cc'd to Garry Alexander (EAO) regarding his response to Proponent's responses to  
his original comments on the project;  
Email with attachment dated Feb 4/05 from Rennie Tupper (NRCan) to Garry  
Alexander (EAO) with additional comments;  
Email with attachment received Feb 2/05 from Rennie Tupper (NRCan) to Garry  
Alexander (EAO) with additional comments regarding the Red Chris application  
and addendum;  
Email dated Jan 28/05 from Carl Alleyne, Health Canada to Garry Alexander, EAO  
with comments on the application and addendum;  
Letter dated Jan 20/05 from Stephen Sheehan (EC) to Garry Alexander (EAO)  
regarding their comments on the project;  
Letter dated Jan 21/05 from Rennie Tupper (Natural Resources Canada) to Garry  
Alexander (EAO) regarding their comments on the project; and  
Email letter dated Jan 21/05 from Derek Nishimura (DFO) to Garry Alexander (EAO)  
regarding their comments on the project.

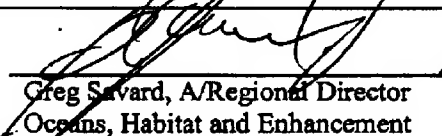
## SCREENING REPORT for the RED CHRIS MINE PROJECT

### 10.0 Screening Conclusion

Fisheries and Oceans Canada and Natural Resources Canada have completed the screening of the Project under the CEAA. The RAs have determined that, taking into account the implementation of the proposed mitigation measures, the Project is not likely to cause significant adverse environmental effects.

#### Approved by the following Responsible Authorities

Environmental Screening Report Approved by:		<i>May 2, 2006</i>
Name:	Brian Calvert, Director, Environmental Assessment and Regulatory Affairs Division Programs Branch Minerals and Metals Sector Natural Resources Canada	Date
<i>The above has reviewed this environmental screening report and verifies that it meets the requirements of the CEAA.</i>		

Environmental Screening Report Approved by:		<i>May 2/06</i>
Name:	Greg Savard, A/Regional Director Oceans, Habitat and Enhancement Branch, Fisheries and Oceans Canada, Pacific Region	Date
<i>The above has reviewed this environmental screening report and verifies that it meets the requirements of the CEAA.</i>		